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ARTICLE

Social sciences teaching and information processing. An experience using WebQuests in primary education teacher training

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Abstract

The main aim of this study is to show the utility of information and communication technologies (ICTs) in primary education teacher training. A series of experiences using these resources was produced and then undertaken by students to facilitate their learning of the curricular components of social sciences teaching. This practical exercise was implemented on the Didactic Methodology subject for social sciences teaching, offered on the Primary Education bachelor's degree course. The experience shows how the students produced a WebQuest and developed the learning process for both the subject's curricular content and competencies.

Keywords

ICTs, social sciences didactics, teacher training, primary education

La enseñanza de las ciencias sociales y el tratamiento de la información. Una experiencia con el uso de webquests en la formación del profesorado de educación primaria

Resumen

El objetivo principal de este trabajo es mostrar la utilidad de las tecnologías de la información y de la comunicación en la formación del profesorado de educación primaria. Con el uso de estos recursos, se han elaborado una serie de experiencias, llevadas a cabo con los estudiantes, para facilitar el aprendizaje de los elementos curriculares necesarios en la enseñanza de las ciencias sociales. Esta práctica se ha desarrollado en la asignatura Metodología didáctica para la enseñanza de las ciencias sociales, ofertada en el grado de Educación Primaria. La experiencia muestra cómo los alumnos elaboraron una webquest y el proceso de aprendizaje tanto de los contenidos curriculares de la asignatura como de las competencias desarrolladas.

Palabras clave

TIC, didáctica de las ciencias sociales, formación del profesorado, educación primaria

1. Introduction

The didactic experience presented in this article was implemented on the Didactic Methodology subject for social sciences teaching, offered on the Primary Education bachelor's degree course at the University of Murcia (UM), Spain. Through this experience, the students had to familiarise themselves with didactic methodology and with the use of tools and resources in order to apply their knowledge in the primary classroom. It was crucial for the students to be able to manage the variety of teaching recourses and tools in the field, as well as the new utilities that information and communication technologies (ICTs) offer in order to improve teaching.

Taking the particular subject specifications into account, the teaching team proposed a compulsory practical exercise involving the creation of a WebQuest to encourage students to

use new technologies, both for their own training and for future teaching practice. The students expanded certain aspects of the subject content by producing new materials or developing new applications for that content. The students had to use a range of capacities: analysis, evaluation, reasoning, information evaluation, etc. This provided them with useful strategies for acquiring skills relating to ICTs and to accessing information on the Internet. The key aspect was the active role that the students played in resource creation (Soep, 2012). Learning via WebQuests clearly allows work to be done on the acquisition of competencies and skills, such as information processing and digital competency, learning to learn, autonomy and personal initiative, among others (Barba, 2008). Furthermore, their specific use in higher education teaching has proven highly effective, as several studies on the topic have demonstrated (Bernabé, 2008; Quintana & Martín, 2011).

However, the novelty of our proposal resides in the fact that the students themselves were responsible for the production process, as well as the planning of the proposed core task for future educational use. In the field of higher education teaching, new technologies are undeniably underused (Selwyn, 2007), and the traditional classroom – where collaborative work is scarce – still prevails (Welker & Berardino, 2005-2006). With this activity, the objective was to overcome such obstacles and to get the students not only to participate fully in the production of social sciences content, but also to become aware of the fact that the proper use and effective management of information are as important as the product of the information itself.

2. ICTs, teacher training and social sciences teaching

The place that ICTs now occupy in society means that teachers have had to take on new roles in knowledge management and transfer (González, 2008). Hence, a fundamental issue is the ability to make full use of Internet functions (conveying information and facilitating communication) as a didactic support for face-to-face teaching. The integration of ICTs into education is usually connected with the use of new media and educational innovation, though it should really be connected with a significant improvement in the teaching-learning process (De Haro, 2009). These changes may represent adjustments rather than revolutions (López Yáñez, 2010); they can be understood as elements of transformation, renewal and improvement (Rubia et al., 2010), and should be planned and intentional (Sangrà, 2011). The use of new technologies does not automatically imply an increase in teaching quality. In fact, instead of making student learning better, the integration of ICTs into unsuitable formative models can actually make it worse, thus increasing both the teachers' and the students' burden (Rodríguez Izquierdo, 2011). Future teachers should therefore direct the use of new technologies towards improving the learning process and fostering the teaching of skills, capacities and competencies.

The introduction of *digital competency* into the field of education means that many schools have had to review their infrastructure and resources; teaching staff have also had to bring themselves up to date with new technology use and teaching to enable their students to become digitally literate (Rodríguez Illera, 2004). That is why it is so important for future teachers to overcome some of the problems that they come up against when using ICTs and applying them to teaching. As Gutiérrez,

Yuste, Cubo and Lucero (2011) pointed out, the lack of students' technological skills, collaborative work capacities and poor reading skills may represent a barrier when it comes to implementing new learning methodologies that integrate ICTs. While today's university students are accustomed to using new technologies in their daily lives, several studies have drawn attention to the fact that many students are unsure how to integrate such technologies into their education (Barnes, Marateo & Ferris, 2007)

In order to fully develop information processing and digital competencies, it is essential to underscore the fact that information itself does not lead directly to knowledge. Turning information into knowledge requires reasoning skills to enable information to be organised, related, analysed and summarised, and to make inferences and deductions with different levels of complexity. According to Contreras and Vásquez (2007), the development of research implies strengthening various skills, such as observation, data systematisation, hypothesis making, reflection and action. Among teaching staff, there is clearly an important conviction that new learning and new teaching skills are required because today's society is very different from that of previous generations (López Facal, 2010). Thus, in order to acquire that knowledge, it is essential to make full use of the information that new technologies can provide, and also to analyse it critically by means of independent personal work and collaborative work, getting to know and relating to physical and social environments that are ever broader (Coll, Mauri & Onrubia, 2006; Lara & Repáraz, 2007; MacGregor & Lou, 2004).

All of these aspects must situate teaching staff as the active protagonist in digital competency development. Teachers are therefore compelled to encourage students to develop a series of skills that enable them to access and manage the information that is available on the Internet, bearing in mind that the web is dynamically and constantly being updated (Monereo, 2005). However, for teachers to be able to convey those skills, they must first acquire them properly. We need reflective and active teachers that are capable of generating in-depth learning from the wealth of didactic resources and materials that ICTs provide us with (De Pablos et al., 2010). Thus, Education faculties should focus on the acquisition of that competency – over and above the ability to use new technologies – and thoroughly address information management and processing. This means that teachers will have to adopt a new, open attitude towards innovation, and use new technologies and virtual environments to improve the teaching-learning process (De Pablos, 2008; Del Moral & Villalustre, 2012).

In the last decade, studies conducted on social sciences teaching have insisted on the need to include ICTs in the classroom. According to Acosta (2010), history is at a disadvantage when compared to experimental sciences because of the impossibility of reproducing the historical events that are taken as objects of study. ICTs provide teachers with the opportunity to solve some of those problems. The main advantages of using new technologies for social sciences teaching have revolved around self-regulated meaningful learning, collaboration (both among students and between teachers and students), and a more individualised kind of teaching. Furthermore, as shown by Hernández (2011) and Rivero (2011), the use of virtual characters, interactivity and expository multimedia – all of which are enabled by new technologies – are some of the main elements that strengthen geography and history teaching.

However, it is also essential to insist on the utility that new technologies have in the field of social sciences, over and above being a support resource for teaching practice, and to show the opportunities that they offer for strengthening social and citizenship competencies. In this respect, if, as Selwyn (2004) indicated, we consider that a person is competent in civic values when he/she is capable of understanding, developing and taking a stance in a specific context of action in political, social or economic life, the proper use and management of information that new technologies offer will allow students to acquire social skills and exercise active, participatory and critical citizenship. It is essential for future teachers to have teaching competencies that enable them to undertake their educational work in compliance with the didactic objectives stipulated in the new regulations (Pavié, 2011). In this respect, the use of WebQuests in primary education teacher training, from the perspective of social sciences didactics, enables a more in-depth knowledge of the key concepts of geography and history teaching to be fostered among future teachers. In addition, it helps them acquire – and be able to convey – information management and processing skills to attain a critical and reflective attitude that allows them to distinguish between fact and opinion, and also to consolidate their capacity to construct knowledge.

3. Results from the experience in the classroom

3.1. Prior considerations

The described activity was supervised by five lecturers that taught the Didactic Methodology subject in the 2011/2012 academic year. It was done by seven groups (a total of 529 students) in the third year of the Primary Education bachelor's degree course at the UM.

A WebQuest was chosen because it allowed several objectives to be met, over and above learning to create and use it. One was to strengthen the students' independent learning by developing tools for a type of learning that is more comprehensive and, above all, more procedural and competential. This orientation was the basis of the innovative nature of the project presented (González, 2008). A further objective was to enable the students to acquire the capacity to plan and programme teaching, and also to become aware of the importance of selecting and critiquing information. This allowed us to strengthen reflection on their roles as mediators in the teaching-learning process (Marquès, 2011), where the teacher has to foster knowledge construction, encourage a critical and reflective attitude, and promote learning that insists on greater student independence. The WebQuest turned out to be a very useful tool in all respects.

Focusing on the contribution of this proposal to the specific task of teaching planning, we would underscore the observation made by Martín (2004), who compared the process of producing a WebQuest to that of a conventional didactic unit. Its constituent parts represent a stimulus for reflection on teaching actions, which directly contributes to the development and acquisition of pedagogical and curricular competencies (Correa, 2004). This can be appreciated from a WebQuest's sections:

- *Introduction*. The activity is introduced. A context is offered and a student motivating objective is designed.
- *Task*. The task that the students have to perform is specified. The clarity and conciseness of drafting the proposed task are key.
- *Process*. Every step that the students need to follow is described in detail to ensure that they are able to perform the assigned task properly, taking into account the problems that they may come up against in the process.
- *Resources*. In order to perform the task, the students will have to use certain resources, which are classified and explained in this section. A proper selection of resources is key to the success of the specified activity, since they should be perfectly adapted to the cognition of the students at whom they are directed.
- *Evaluation*. How the teacher is going to evaluate the activity is indicated, specifying what the expected outcome of the performed task is.
- *Conclusions*. As a way of closing the activity, a conclusion about what has been learned must be given and/or some aspect of the work must be highlighted.

As a complement to the above-mentioned proposal, a search for information on the Internet was performed individually and independently, which implied a task of compiling, reading, selecting and reflecting. This allowed work to be done on various components of social sciences content included in the Primary Education curriculum, and also their level of comprehension and critical capacity to be ascertained, particularly when adapting such resources to the selected cycle and course. This phase was fundamental, as the suitability of the process, the task and the proposed resources would depend on the degree of comprehension and mastery of the selected topic by the activity's creator-organiser (Correa, 2004). Thus, the capacities demanded of the university students from the designed WebQuest work were similar to those that they would demand of their future students: analysis, evaluation, summarising and reasoning, as applied to a set of specific content components.

Besides this, they were asked to produce an activity guide for teaching use, in which they had to indicate the number of sessions, objectives, content components and competencies, as well as the methodology applied. Lastly, the way in which the proposal would be evaluated was specified, and the evaluation criteria were defined. The completion of this data sheet provided the assurance that the activity planning had been thoroughly thought out, and attempts were also made to ensure that direct work was done on the education legislation in force.

3.2. Didactic considerations

As already mentioned, the aim of this activity was to ensure that the students would be capable of selecting and critically analysing information; of sequencing and properly organising objectives, content components, competencies, activities, evaluation criteria and tools; and also of evaluating the importance of planning in teaching actions. In addition, it allowed us to introduce aspects particular to research methodology, and it facilitated the learning and comprehension of vocabulary specific to the subject and to geographical and historical concepts.

Likewise, this exercise contributed to the acquisition of many generic university competencies, especially those relating to interpersonal skills, knowledge applied to the field of study, the capacity to adapt knowledge to practice, independent work, information management skills, the capacity to analyse and summarise, and research skills (Bernabé, 2008). In itself, the process of creating a WebQuest enables skills for accessing and managing ICT tools to be fostered. The need to incorporate reliable, high-quality sources and resources to complete the research task that a WebQuest involves promotes the capacity to manage information and the development of research skills; it also encourages thinking and critical analysis. The process of planning its implementation is the perfect pretext for students to learn about the social sciences school curriculum, and the need to evaluate the designed activity enables teaching reflection on the activity itself.

3.3. Activity development

The production of a WebQuest was proposed as a group activity (between four and six members per group). Three two-hour practical sessions were held; the students' independent work outside the classroom was additional to these.

In order to create a WebQuest, two tools were recommended; these had been selected because of their ease of use. *El creador de webquest online* (Jorquera, 2011) and *1, 2, 3: Tu WebQuest* (Muñoz & Valero).

Each student group freely selected the content components that it wanted to work on, hence the topics were diverse: Spanish rivers, environmental conservation, the water cycle, the life of the Iberians, the discovery of America, and so on. This enabled us to expand the geographical and historical content components that would be worked on in our classrooms, thanks to the oral presentations of the activity. In addition, they would be uploaded to the wiki created for that purpose, thus facilitating their consultation.¹

3.4. Activity evaluation

The evaluation of the WebQuest addressed several very specific criteria: planning realism and the proper selection of content components and their originality. These were evaluated using a system of rubrics – in some cases accompanied by a co-evaluation activity – that enabled the teaching-learning process to be strengthened and critical thinking to be fostered (Fernández, 2011).

The biggest problem that we could have come up against when implementing the proposal would have been the amount of time needed to do it if the students' digital competency had not been what we had expected. That is why we considered it essential to ascertain the students' perceptions of an activity of this type, of the difficulties they had faced, and of the procedures and attitudes that they had acquired by producing the WebQuest.

1. See <http://didactictac.wikispaces.com/WebQuest>.

Table 1. Activity evaluation criteria

| <i>Evaluation criteria</i> |
|--|
| <i>Evaluation of the planning process</i> <input checked="" type="checkbox"/> The objectives, content components, competencies, methodology and activities, as well as the evaluation criteria and tools, are properly selected, sequenced and organised. <input checked="" type="checkbox"/> The vocabulary specific to social sciences methodology and didactics is known and used. <input checked="" type="checkbox"/> The importance of planning in the organisation of the teaching-learning process is evaluated. |
| <i>Evaluation of the WebQuest and its content</i> <input checked="" type="checkbox"/> It is original and attractive. <input checked="" type="checkbox"/> It is suited to the selected cycle/level. <input checked="" type="checkbox"/> Suitable language and vocabulary is used. <input checked="" type="checkbox"/> The information and resources used are selected critically. <input checked="" type="checkbox"/> The selected resources are suited to the cycle/level. <input checked="" type="checkbox"/> The task and the process that students have to perform and follow, as well as their evaluation and conclusion, are properly introduced and developed. |

The technique used to evaluate it was a questionnaire containing closed questions, which had been validated beforehand by university experts from the field of Social Sciences Didactics. The students completed the questionnaire anonymously, giving scores for a total of 12 statements. The scale for scoring all the statements was as follows: 1=Not at all, 2=A little, 3=Quite a lot, 4=A lot. All 529 students that did the activity responded. The items and the scores obtained are shown in Table 2.

Table 2. Questionnaire – Activity evaluation by the students

| <i>Statements made</i> | <i>Score out of 4</i> |
|---|--|
| <i>Producing the WebQuest helped me. . .</i> <input checked="" type="checkbox"/> . . . improve my IT skills. <input checked="" type="checkbox"/> . . . understand the importance of planning in the teaching-learning process. <input checked="" type="checkbox"/> . . . programme activities consistently, taking into account the objectives, content components, competencies, etc. <input checked="" type="checkbox"/> . . . develop a greater critical attitude when searching for sources of information on the Internet. <input checked="" type="checkbox"/> . . . understand the importance of adapting Internet resources to students of different ages and educational levels. | 2.50 2.99 3.27 2.92 3.40 |
| <i>It also enabled me to. . .</i> <input checked="" type="checkbox"/> . . . reflect on the value of ICTs in the teaching-learning process. <input checked="" type="checkbox"/> . . . appreciate the work done by teachers who use ICTs in the classroom, assuring educational innovation. | 3.24 3.36 |
| <input checked="" type="checkbox"/> It was a motivating activity. <input checked="" type="checkbox"/> It contributed to my training as a teacher. <input checked="" type="checkbox"/> I am satisfied with what I have learned from doing this practical activity. <input checked="" type="checkbox"/> I have developed competencies that may be useful in my future working life. <input checked="" type="checkbox"/> The choice of a WebQuest as a resource on which too work was suitable. | 3.06 3.04 3.06 3.02 3.14 |

After analysing the results from the questionnaire, it was found the students had positively evaluated the contribution made by this activity to their capacity to programme activities

consistently (3.27 out of 4), to their understanding of the importance of adapting Internet resources to students of different ages and educational levels (3.40), to their reflection on the value of ICTs in the teaching-learning process (3.24), and to their appreciation of the work done by teachers who use ICTs in the classroom, assuring educational innovation (3.36). Likewise it helped them understand the importance of planning in the teaching-learning process (2.99), and to develop a greater critical attitude when searching for sources of information on the Internet (2.92). To a lesser extent, producing a WebQuest enabled the students to improve their IT skills (2.50). It also turned out to be quite a motivating activity (3.06), and it also contributed to their training as teachers (3.04) and enabled them to develop competencies that might be useful in their future working lives (3.02). Lastly, the surveyed students stated that they were quite satisfied with what they had learned from doing the practical activity (3.06) and considered that a WebQuest as a resource on which too work was suitable (3.14).

4. Conclusion

Producing a WebQuest and planning its implementation contributed to the development of competencies. In particular, the importance of information processing and digital competencies means that teaching staff must now have the skills to properly use information from the Internet and to turn it into knowledge. As such, it should be a key element of their training. However, this cannot be limited to software knowledge or software use in the classroom. Instead, the goal should always be that of improving the teaching-learning process. Whether teaching is traditional or innovative will depend on a teacher's use of ICTs.

The results obtained from the 529 students' evaluations of the activity were satisfactory. The fact that the students valued WebQuest creation and work as a whole, the acquisition of skills relating to activity and resource programming and adaption, and also the need for teachers to use ICTs to drive educational innovation, all together reinforce this conclusion. WebQuest creation managed to foster the students' acquisition of new content components through a motivating activity, and it enabled the future teachers to thoroughly address these skills. The outcome of the experience shows the potential of using this tool, both in the didactic sphere and in the purely disciplinary sphere, and also its future application in teaching practice in the classroom. However, we are aware of the fact certain aspects of this activity need to be improved, such as those pertaining to the acquisition of skills relating to the development of a greater critical attitude when searching for sources of information on the Internet.

In short, the most important thing about using new technological applications is not simply to use them, but to use them to produce innovation in teaching. If the methodology does not change, ICTs will serve little purpose. The main challenge resides in directing our efforts towards the social processing of information and the collaborative construction of knowledge (precisely along the lines of WebQuests). The use of these media must foster independent, creative and critical thinking.

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Web resources

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